

CLAIMS

1. A filter (1) for filtering a fluid directed towards a patient, comprising a box casing (2) in which at least one cavity (37) is present defined by an outer element (3, 4) of said casing (2) and an inner surface (5A, 5B) presenting a plurality of channels (21) on which a corresponding hydrophilic filtering membrane (30) lies, said cavity (37) communicating with a conduit (27) for entry of the fluid into the filter (1) and said channels (21) being connected to a conduit (23) for exit of said fluid from the filter (1), in said element (3, 4) of the box casing (2) there being provided spaced-apart through apertures (40, 41) close to its opposing ends (42, 43) and with which hydrophobic membranes (44) are associated, characterised in that a surface (S1) bounded by an ideal closed line (70), which totally comprises all the hydrophobic membranes (44), contains substantially within its interior the projection thereon of the useful hydrophilic surface (S2) of the hydrophilic filtering membrane (30), this enabling the filter (1) to be employed in a plurality of spatial positions during its use.

2. A filter as claimed in claim 1, characterised in that the closed line bounding the surface (S1) comprising the hydrophobic membranes (44) is the shortest line which joins these latter together.

3. A filter as claimed in claim 1, characterised in that the distance between said element (3, 4) of the box casing (2) and the hydrophilic filtering membrane (30) lies between 0.1 mm and 3 mm, preferably between 0.5 mm and 2 mm.

4. A filter as claimed in claim 3, characterised in that the distance between said element (3, 4) of the box casing (2) and the hydrophilic filtering membrane (30) lies between 0.5 mm and 1.5 mm.

5. A filter as claimed in claim 1, characterised in that the through apertures (40, 41) have a size identical to that of the membranes (44) associated with them.

6. A filter as claimed in claim 1, characterised in that the through
5 apertures (40, 41) have a size less than that of the membranes (44) associated with them.

7. A filter as claimed in claim 6, characterised in that each membrane (44) is associated with a recess (45, 47, 50, 53) provided within a face (6B, 7B) of the element (3, 4) of the box casing (2) facing the hydrophilic
10 membrane (30), with said recess (45, 47, 50, 53) there being associated at least one aperture (40, 41) opening into the opposing face (6A, 7A) of said element (3, 4), between said aperture and said recess there being present at least one step (48) so that the aperture has a size less than that of the recess.

15 8. A filter as claimed in claim 7, characterised in that the recess is of polygonal shape.

9. A filter as claimed in claim 7, characterised in that the recess is of circular shape.

10. A filter as claimed in claim 1, characterised in that each
20 hydrophobic membrane (44) has a surface greater than that of the aperture (40, 41) with which it is associated.

11. A filter as claimed in claim 10, characterised in that the hydrophobic membrane is fixed to that face (6B, 7B) of the element (3, 4) of the box casing (2) facing the hydrophilic membrane (30), in correspondence
25 with the relative aperture (40, 41).

12. A filter as claimed in claim 1, characterised in that the channels (21) of the inner surface (5A, 5B) present a closed end (21A) facing and

close to the entry conduit (27), and the other end (21B) connected to the exit conduit (23).

13. A filter as claimed in claim 12, characterised in that the closed end (21A) of said channels (21) is closed by an annular element (19) which
5 surrounds said channels (21).

14. A filter as claimed in claim 1, characterised in that the entry conduit (27) and exit conduit (23) are provided within an element (5) of the box casing (2) presenting the surface (5A, 5B) with the channels (21) and connected to the outer element (3, 4) of said casing (2).

10 15. A filter as claimed in claim 14, characterised in that the entry conduit (27) and exit conduit (23) are provided within stems (29, 24) projecting from the box casing element (5) provided with channels (21).

16. A filter as claimed in claim 15, characterised in that around each stem (24, 29) an annular rim (93) is present defining with the corresponding
15 stem (24, 29) a recess (94) for receiving the end of a corresponding conduit connected to the filter.

17. A filter as claimed in claim 14, characterised in that the element (5) with the surface (5A) provided with channels (21) presents a second surface (5B), opposing the surface (5A) with channels, but not provided with
20 these latter.

18. A filter as claimed in claim 14, characterised in that the element (5) with the surface (5A) provided with channels (21) presents a second surface (5B), opposing the surface (5A) with channels (21) and shaped as this latter, to the front of said second surface (5B), also provided with
25 channels (21) on which a hydrophilic membrane (30) is superposed, there being positioned a second outer element (4) of the box casing (2) provided with apertures (40, 41) with which hydrophobic membranes (44) are

associated, between said second outer element (4) and the element (5) with the surfaces (5A., 5B) provided with channels (21) there being present a cavity (37) connected to the entry conduit (27), said element (5) with the surfaces (5A, 5B) provided with channels (21) being intermediate between
5 the outer elements (3, 4) of the box casing (2).

19. A filter as claimed in claim 1, characterised in that the apertures (40, 41) are connected to recesses (97) provided in a free face (6A, 6B) of the corresponding outer element (3, 4).

20. A filter as claimed in claim 19, characterised in that the recesses
10 (97) lie parallel to the longitudinal axis (A) of the filter.

21. A filter as claimed in claim 1, characterised in that the apertures (40, 41) cooperate with removable shut-off members.

22. A filter as claimed in claim 21, characterised in that the shut-off members are connected to the filter casing (2).

15 23. A filter as claimed in claim 22, characterised in that the shut-off members are completely separable from the filter casing (2).